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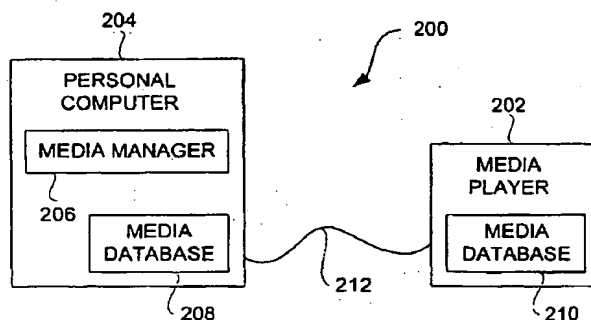
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(54) **SYNCHRONISATION INTELLIGENTE POUR UN DIFFUSEUR DE MEDIAS**

(54) **INTELLIGENT SYNCHRONIZATION FOR A MEDIA PLAYER**

(57)

Improved techniques for interaction between a host computer (e.g., personal computer) and a media player are disclosed. According to one aspect, interaction between a host computer and a media player, such as automatic synchronization of media contents stored on a media player with media contents stored on a host computer, can be restricted. In one implementation, a given media player is able to automatically interact only with a designated host computer. According to another aspect, synchronization can be automatically initiated and performed upon connection of a data link between the media player and the host computer. According to still another aspect, synchronization is able to be achieved with a reduced amount of data transfer between the host computer and the media device. According to yet another aspect, management of media items residing on a media player can be performed at and by a host computer for the media player. According to still yet another aspect, media content can be played by a media player in accordance with quality settings established for the media content at the host computer. In one implementation, the quality settings can be established for the media content on a media item by media item basis.





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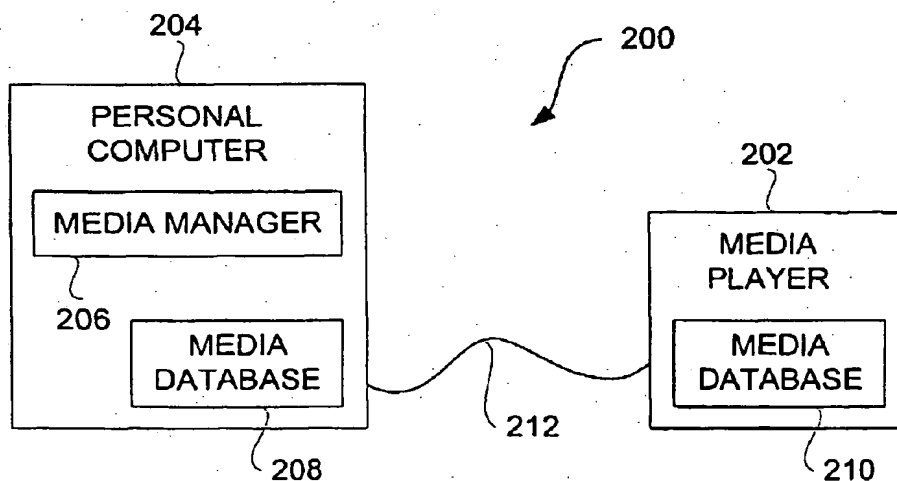
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(57) **Abrégé/Abstract**

Improved techniques for interaction between a host computer (e.g., personal computer) and a media player are disclosed. According to one aspect, interaction between a host computer and a media player, such as automatic synchronization of media contents stored on a media player with media contents stored on a host computer, can be restricted. In one implementation, a given media player is able to automatically interact only with a designated host computer. According to another aspect, synchronization can be automatically initiated and performed upon connection of a data link between the media player and the host computer. According to still another aspect, synchronization is able to be achieved with a reduced amount of data transfer between the host computer and the media device. According to yet another aspect, management of media items residing on a media player can be performed at and by a host computer for the media player. According to still yet another aspect, media content can be played by a media player in accordance with quality settings established for the media content at the host computer. In one implementation, the quality settings can be established for the media content on a media item by media item basis.

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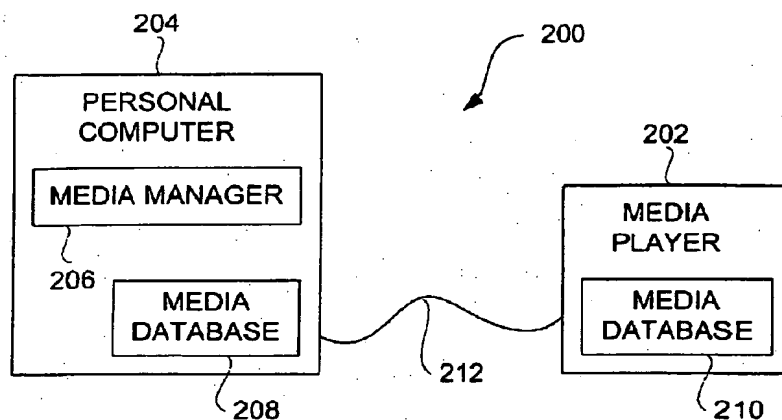
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(54) Title: INTELLIGENT SYNCHRONIZATION FOR A MEDIA PLAYER



(57) Abstract: Improved techniques for interaction between a host computer (e.g., personal computer) and a media player are disclosed. According to one aspect, interaction between a host computer and a media player, such as automatic synchronization of media contents stored on a media player with media contents stored on a host computer, can be restricted. In one implementation, a given media player is able to automatically interact only with a designated host computer. According to another aspect, synchronization can be automatically initiated and performed upon connection of a data link between the media player and the host computer. According to still another aspect, synchronization is able to be achieved with a reduced amount of data transfer between the host computer and the media device. According to yet another aspect, management of media items residing on a media player can be performed at and by a host computer for the media player. According to still yet another aspect, media content can be played by a media player in accordance with quality settings established for the media content at the host computer. In one implementation, the quality settings can be established for the media content on a media item by media item basis.

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## INTELLIGENT INTERACTION BETWEEN MEDIA PLAYER AND HOST COMPUTER

### BACKGROUND OF THE INVENTION

[0001] The present invention relates to media devices and, more particularly, to synchronization or management of media on media devices.

[0002] Synchronization operations have been conventionally performed between portable devices, such as Personal Digital Assistants (PDAs) and host computers, to synchronize electronic files or other resources. For example, these files or other resources can pertain to text files, data files, calendar appointments, emails, to-do lists, electronic rolodexes, etc. However, such synchronization schemes tend to utilize filenames and modification dates to determine whether files need to be copied between the devices. These synchronization schemes can be largely automated but nevertheless have to be manually initiated.

[0003] In the case of media players, such as MP3 players, files are typically moved between a host computer and a media player through use of a drag and drop operation, like is conventionally done with respect to copying of a data file from a Windows desktop to a floppy disk. Hence, the user of the media player manually initiates the synchronization for individual media items. As a consequence, synchronization tends to be tedious and time consuming for users. Synchronization tends to be slow because data is transmitted between devices over a slow link.

[0004] Besides synchronization, management of resources on these portable devices has also been separately performed. For example, a user of a PDA can enter an appointment or a new contact using only the PDA, and then subsequently a host computer could, if desired, be updated (through synchronization) to include identical information. A user can also interact with the host computer to change appointments or contacts, and then subsequently have those changes be reflected on the PDA (through synchronization). As for interaction with the portable devices (e.g., PDAs), the portable devices

normally are small form factor devices so as to be hand-held or pocket-size. Although their small size makes the portable devices convenient to carry, it makes the available screen display size small. Consequently, it is difficult for user to interact with the portable devices to manage resources thereon.

[0005] Thus, there is a need for improved techniques for improved approaches to synchronize or manage media content on host computers and/or media players.

### **SUMMARY OF THE INVENTION**

[0006] The invention relates to interaction between a host computer (e.g., personal computer) and a media player. According to one aspect of the invention, interaction between a host computer and a media player, such as automatic synchronization of media contents stored on a media player with media contents stored on a host computer, can be restricted. In one implementation, a given media player is able to automatically interact only with a designated host computer. According to another aspect of the invention, synchronization can be automatically initiated and performed upon connection of a data link between the media player and the host computer. According to still another aspect of the invention, synchronization is able to be achieved with a reduced amount of data transfer between the host computer and the media device. According to yet another aspect of the invention, management of media items residing on a media player can be performed at and by a host computer for the media player. According to still yet another aspect of the invention, media content can be played by a media player in accordance with quality settings established for the media content at the host computer. In one implementation, the quality settings can be established for the media content on a media item by media item basis.

[0007] Other aspects and advantages of the invention will become apparent from the following detailed description taken in conjunction with the accompanying drawings which illustrate, by way of example, the principles of the invention.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

[0008] The invention will be readily understood by the following detailed description in conjunction with the accompanying drawings, wherein like reference numerals designate like structural elements, and in which:

FIG. 1 is a block diagram of a media management system according to one embodiment of the invention.

FIG. 2 is a block diagram of a media synchronization system according to one embodiment of the invention.

FIG. 3 is a flow diagram of media manager processing according to one embodiment of the invention.

FIG. 4 is flow diagram of synchronization processing according to one embodiment of the invention.

FIGs. 5A and 5B illustrate media device synchronization processing according to one embodiment of the invention.

FIGs. 6A and 6B are flow diagrams of host computer synchronization processing according to one embodiment of the invention.

FIG. 7 is a block diagram of a media management system according to another embodiment of the invention.

FIG. 8 is a flow diagram of automatic synchronization processing according to one embodiment of the invention.

FIG. 9 is a flow diagram of media download processing according to one embodiment of the invention.

FIG. 10 is a flow diagram of media play processing according to one embodiment of the invention.

FIG. 11 is a block diagram of a media player according to one embodiment of the invention.

### **DETAILED DESCRIPTION OF THE INVENTION**

[0009] The invention relates to interaction between a host computer (e.g., personal computer) and a media player. According to one aspect of the invention, interaction between a host computer and a media player, such as automatic synchronization of media contents stored on a media player with media contents stored on a host computer, can be restricted. In one implementation, a given media player is able to automatically interact only with a designated host computer. According to another aspect of the invention, synchronization can be automatically initiated and performed upon connection of a data link between the media player and the host computer. According to still another aspect of the invention, synchronization is able to be achieved with a reduced amount of data transfer between the host computer and the media device. According to yet another aspect of the invention, management of media items residing on a media player can be performed at and by a host computer for the media player. According to still yet another aspect of the invention, media content can be played by a media player in accordance with quality settings established for the media content at the host computer. In one implementation, the quality settings can be established for the media content on a media item by media item basis.

[0010] According to one embodiment of the invention, the media device is a media player, and the media content on the media player is detailed in a media database residing on the media player. The host computer also stores a media database of the media content on the host computer. Then, on synchronization, the media information stored in the respective media databases can be compared to determine which, if any, media items are to be copied from the host computer to the media player. For example, the media items can pertain to media files for songs, and the media information from the respective databases being compared might include song title, album name and artist name. As a result, the synchronization process is able to be more intelligently performed. Media items can also be removed (or deleted) from the media player if no longer present on the host computer. In other embodiments, media items can additionally or alternatively be copied from the media player to the host computer.



**[0011]** Embodiments of these aspects of the invention are discussed below with reference to FIGs. 1 – 11. However, those skilled in the art will readily appreciate that the detailed description given herein with respect to these figures is for explanatory purposes as the invention extends beyond these limited embodiments.

**[0012]** FIG. 1 is a block diagram of a media management system 100 according to one embodiment of the invention. The media management system 100 includes a media player 102 and a personal computer (host computer) 104. The media player 102 is, for example, a portable, battery-operated device. In one embodiment, the media player 102 is an MP3 player. The personal computer 104 includes a media manager 106. The media manager 106 enables a user of the personal computer 104 to directly manage media content stored on the personal computer 104, and to indirectly manage media content stored on the media player 102. A peripheral cable 108 couples the media player 102 to the personal computer 104. Typically, the peripheral cable 108 couples together data ports provided on the media player 102 and the personal computer 104. In one example, the data ports can be FIREWIRE ports and the peripheral cable 108 can be a FIREWIRE cable. More generally, the peripheral cable 108 acts as a data link. Media items can be transferred from the media player 102 to the personal computer 104 over the peripheral cable 108, and vice versa. For example, the media manager 106 facilitates a user with browsing, adding, deleting, organizing, and other operations with respect to media content (e.g., numerous media items) on the personal computer 104. Additionally, for example, the media manager 106 also facilitates a user with adding and removing media content on the media player 102. In other words, although the media manager 106 resides on the personal computer 104, at least certain management action taken with respect to the media manager 106 can cause the media content at the media player 102 to be similarly managed (e.g., during synchronization).

**[0013]** In one embodiment, the media player is a portable computing device dedicated to processing media such as audio, video or images. For example, the media player 102 can be a music player (e.g., MP3 player), a game player,

a video player, a video recorder, a camera, an image viewer and the like. These devices are generally battery operated and highly portable so as to allow a user to listen to music, play games or video, record video or take pictures wherever the user travels. In one implementation, the media player is a hand-held device that is sized for placement into a pocket or hand of the user. By being hand-held, the media player is relatively small and easily handled and utilized by its user. By being pocket sized, the user does not have to directly carry the device and therefore the device can be taken almost anywhere the user travels (e.g., the user is not limited by carrying a large, bulky and often heavy device, as in a portable computer). Furthermore, the device may be operated by the users hands, no reference surface such as a desktop is needed.

[0014] FIG. 2 is a block diagram of a media synchronization system 200 according to one embodiment of the invention. The media synchronization system 200 can, for example, represent one embodiment of the more general media management system 100 illustrated in FIG. 1. The media synchronization system 200 includes a media player 202 and a personal computer 204. The personal computer 204 includes a media manager 206. The personal computer 204 further includes a media database 208. The media player 202 includes a media database 210. Typically, the media player 202 will also include a data storage device (e.g., disk drive) for storing media content, a cache memory for storing media content in-use, a screen display for displaying information to a user, and a processor (e.g., microprocessor) for controlling operation of the media player 202.

[0015] A peripheral cable 212 provides a data path (or data link) between the media player 202 and the personal computer 204. The peripheral cable 212 provides a peripheral bus that couples the media player 202 to the personal computer 204. The peripheral bus, for example, could be a FIREWIRE bus or a Universal Serial Bus (USB). A synchronization operation between the media content stored on the personal computer and the media content stored on the media player 204 can be achieved in a sophisticated manner through comparison of media information stored in the respective media databases 208 and 210. When comparison of the media information

from the respective databases 208 and 210 indicates that there is a particular media item resident on the personal computer 204 that is not resident on the media player 202, then the particular media item can be transmitted (downloaded) to the media player over the peripheral cable 212. On the other hand, when the comparison of the media information from the respective databases 208 and 210 indicates that a particular media item is resident on the media player 202 but is not resident on the personal computer 204, then the particular media item can be either removed (deleted) from the media player 202 or transmitted (e.g., uploaded) over the peripheral cable 212 to the personal computer 204. Hence, by providing the media player 202 with the media database 210, more sophisticated synchronization and management of media content is enabled.

**[0016]** The media database 210 also allows the media player 202 to present a user interface to the user that is more sophisticated than conventional approaches. Such a user interface can be presented on the screen display of the media player 202. The user interface can, for example, allow the user of the media player 202 to browse, sort, search, play, etc. the media content resident on the media player 202. The user interface can also allow the user of the media player 202 to download (add) or delete (remove) media items from the media player 202. The media manager 206 also has a user interface that allows a user to browse, sort, search, play, make playlists, burn Compact Discs (CDs), etc. the media content resident on the personal computer 204. The user interface can also allow the user of the personal computer 204 to download (add) or delete (remove) media items from the personal computer 204. In one embodiment, the media manager 206 and its associated user interface are provided by iTunes, version 2.0, from Apple Computer, Inc. of Cupertino, California.

**[0017]** FIG. 3 is a flow diagram of media manager processing 300 according to one embodiment of the invention. The media manager processing 300 is, for example, performed by the media manager 106 illustrated in FIG. 1 or the media manager 206 illustrated in FIG. 2.

**[0018]** The media manager processing 300 initially detects 302 a media player connected to a personal computer (host computer). Here, when the media player is connected to the personal computer, a synchronization operation can be performed to synchronize the media content between the media player and the personal computer. After the media player has been detected as being connected to the personal computer, the media content between the media player and the personal computer can be synchronized 304. The synchronization can be performed in a one-way (i.e., uni-directional) manner or in a two-way (i.e., bi-directional) manner. In a preferred embodiment, the synchronization is one-way from the personal computer to the media player. In another embodiment, the synchronization can be one-way from the media player to the personal computer. In still another embodiment, the synchronization can be two-way from the media player to the personal computer as well as from the personal computer to the media player. In any case, the media player typically has less media storage capacity than the personal computer and thus may limit the extent of the synchronization that can be performed. The synchronization processing can be performed manually assuming that a media player has already been detected 302 or automatically upon such detection. In the case of automatic synchronization following detection of the connection, synchronization is performed without a user interacting with any buttons or user interface elements, that is, the connection itself initiates the synchronization.

**[0019]** FIG. 4 is flow diagram of synchronization processing 400 according to one embodiment of the invention. The synchronization processing 400 is, for example, performed by a host computer, such as the personal computer 104 illustrated in FIG. 1 or the personal computer 204 illustrated in FIG. 2. More specifically, the synchronization processing 400 is performed by the media manager 106 illustrated in FIG. 1 or the media manager 206 illustrated in FIG. 2.

**[0020]** The synchronization processing 400 initially reads 402 player media information from a media database on a media player. Next, the player media information is compared 404 with first media information from a media